1. A predictive algorithmic model for simulating photocatalytic reactions comprising:

an input section for defining a plurality of variables;

a calculation section for calculating a plurality of intermediate values and a plurality of output values; and

an output section for providing the plurality of output values of the photocatalytic reactions.

2. The predictive algorithmic model of claim 1 wherein the plurality of variables include material, wavelength and photocatalytic reaction variables.

3. The predictive algorithmic model of claim 1 wherein the plurality of variables include at least a firs laser wavelength, a base fluence value, a fluence increment value, a first gas partial pressure, a partial pressure increment, a total pressure, first and second reactant types, a material absorption coefficient, a material threshold value, a material refractive index, an angle of incidence, and first and second photochemical reaction parameters.

4. The predictive algorithmic model of claim 3 wherein the first laser wavelength is in the range of 100 to 400 nm.

5. The predictive algorithmic model of claim 1 wherein the plurality of intermediate values include first and second optical gas densities, an incident fluence absorbed by gas, a reflected fluence, a total fluence absorbed by gas, a fluence absorbed in material, an ablation depth per pulse, and a photochemical component.

6. The predictive algorithmic model of claim 1 wherein the plurality of output values includes a total material removed and a removal efficiency.

7. The predictive algorithmic model of claim 1 wherein the photocatalytic reactions are ultraviolet catalytic reactions.